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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/731,385	12/06/2000	Myeong-cheol Kim	SAM-164	8322
7590		05/06/2004	EXAMINER	
Mills & Onello LLP		NADAV, ORI		
Eleven Beacon Street		ART UNIT		
Boston, MA 02108		PAPER NUMBER		
		2811		

DATE MAILED: 05/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/731,385	KIM ET AL.	
	Examiner	Art Unit	AK
ori nadav	2811		

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 14-20 is/are pending in the application.
- 4a) Of the above claim(s) 16-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 14 and 15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-11 and 14-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification describes a second conductive layer formed between adjacent conductive patterns and first and second insulation layers extending in the gap between the conductive patterns and the second conductive layer. There is no support in the specification for the claimed limitation of a first insulation layer being located throughout the entire distance between at least one of the conductive patterns and the second conductive layer, as recited in claim 1, since the second insulation layer is not present between at least one of the conductive patterns and the second conductive layer.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1-8, 10 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Nguyen (6,472,261).

Regarding claims 1, 4-7 and 15, Nguyen teaches in figure 6 and related text a semiconductor device having a self-aligned contact, the semiconductor device comprising: a plurality of conductive patterns formed to be adjacent to one another by sequentially stacking and patterning a first conductive layer 14 and a mask layer 18 on a particular underlying layer 10; a first insulation layer 22 filling a gap between adjacent conductive patterns the first insulation layer being formed of a first insulating material and being formed laterally adjacent to and not underneath the conductive patterns,

a second insulation layer 28 having a spacer shape, the second insulation layer formed at the sides of each conductive pattern and over the first insulation layer; the second insulation layer being formed of a second insulating material different from the first insulating material, and

a second conductive layer 42 filling a contact hole which is self-aligned with respect to the second insulation layer between adjacent conductive patterns, the

Art Unit: 2811

contact hole passing through the first insulation layer, the first insulation layer extending between adjacent conductive patterns and between the second conductive layer and the conductive patterns and having a planar top surface throughout the entire distance between at least one of the conductive patterns and the second conductive layer.

Regarding the claimed limitation of a first insulation layer having a planar top surface, although Nguyen teaches in figure 6 a first insulation layer having an L shape, the top surface of the first insulation layer has a planar top surface since it has no curvature in its top surface.

Regarding claim 2, Nguyen teaches in figure 6 a top of the first insulation layer 22 being lower than the top of the first conductive layer 14 of each conductive layer pattern.

Regarding claims 3, Nguyen teaches in figure 6 and related text the top of the first insulation layer 22 (the first insulation layer 22 is taken as the horizontal layer 22 and the vertical layer adjacent to the first conductive layer 14) is higher than the top of the first conductive layer 14 of each conductive layer pattern.

Regarding claim 4-7, Nguyen teaches in figure 6 an etching rate of the first insulation layer is larger than that of the second insulation layer, the dielectric constant of the first insulation layer is smaller than that of the second insulation layer, wherein the first insulation layer is formed of a silicon oxide layer and the second insulation layer is formed of a silicon nitride layer.

Art Unit: 2811

Regarding claim 8, Nguyen teaches in figure 6 a third insulation layer provided between the first insulation layer and the sides of each conductive layer pattern and between the second insulation layer and the side of the conductive layer pattern.

Regarding claim 10, Nguyen teaches in figure 6 a fourth insulation layer 34 provided on the surface of the underlying layer except for a portion contacting the second conductive layer 42 and on the surfaces of the conductive layer patterns.

Regarding claim 15, Nguyen teaches in figure 6 the first conductive layer of each conductive layer pattern is a gate electrode, and the contact contacts the surface of a semiconductor substrate.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen.

Nguyen teaches substantially the entire claimed structure, as applied to dependent claims 8 and 10 and independent claim 1 above, except stating that the third and fourth insulation layers are formed at a thickness of 50-200 Å. It would have been obvious to

Art Unit: 2811

a person of ordinary skill in the art at the time the invention was made to use third and fourth insulation layers at a thickness of 50-200 Å in Nguyen's device, in order to provide adequate insulation to the device and because it is well within the skills of an artisan to optimize the performance of the device by forming the third and fourth insulation layers at the required thickness.

4. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen in view of Huang (5,899,722).

Nguyen teaches substantially the entire claimed structure, as applied to claim 1 above, except using the first conductive layer of each conductive layer pattern as a bit line, and the second conductive layer to connect a storage electrode of a semiconductor capacitor to a semiconductor substrate.

Huang teaches that a self aligned contact structure, similar to that disclosed by Chang et al., can be used in a DRAM. A DRAM comprises a first conductive layer being a bit line, and a second conductive layer serves to connect a storage electrode of a semiconductor capacitor to a semiconductor substrate. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use Nguyen's device in a DRAM device in order to use the device in a specific application which requires a DRAM device. Note that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Art Unit: 2811

See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

Response to Arguments

Applicant argues that Nguyen does not teach a first insulation layer having a planar top surface throughout the entire distance between at least one of the conductive patterns and the second conductive layer, because the first insulation layer has an L shape.

Although the first insulation layer of Nguyen has an L shape, Nguyen teaches in figure 6 a top surface of the first insulation layer having a planar top surface since it has no curvature in its top surface. Therefore, Nguyen teaches a first insulation layer having a planar top surface throughout the entire distance between at least one of the conductive patterns and the second conductive layer, as claimed.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

Art Unit: 2811

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to *Examiner Nadav* whose telephone number is **(571) 272-1660**. The Examiner is in the Office generally between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

Art Unit: 2811

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is **308-0956**

A handwritten signature in black ink, appearing to read 'Ori Nadav', with a stylized flourish at the end.

O.N.
May 4, 2004

ORI NADAV
PATENT EXAMINER
TECHNOLOGY CENTER 2800